This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.

+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.

+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.

+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`

BL241
.P4

[illegible]

from Hon. S. [illegible] White
Feb 8 1851

BL241 .P4
An oration delivered before the Phi
Gutman Library ADR6025
3 2044 028 312 692

AN

ORATION

DELIVERED BEFORE THE

PHI BETA KAPPA SOCIETY.

BY

ANDREW P. PEABODY.

Gift

HARVARD UNIVERSITY
GRADUATE SCHOOL OF EDUCATION
MONROE C. GUTMAN LIBRARY

THE CONNECTION BETWEEN SCIENCE AND RELIGION.

AN
ORATION

DELIVERED BEFORE THE

PHI BETA KAPPA SOCIETY

OF

HARVARD UNIVERSITY,

AUGUST 28, 1845.

BY ANDREW P. PEABODY.

BOSTON:
CHARLES C. LITTLE AND JAMES BROWN.
1845.

BL241
.P4

#45550-19

HARVARD UNIVERSITY
GRADUATE SCHOOL OF EDUCATION
MONROE C. GUTMAN LIBRARY

March 11, 1975

Entered according to Act of Congress, in the year 1845,
By Andrew P. Peabody,
in the Clerk's Office of the District Court of the District of Massachusetts.

BOSTON:
PRINTED BY FREEMAN AND BOLLES,
WASHINGTON STREET.

ORATION.

GENTLEMEN OF THE PHI BETA KAPPA SOCIETY,

MY friend and classmate, who addressed you on your last anniversary, discoursed to you wisely and eloquently on the connection between moral culture and literary success and eminence. I heartily thank him, that he has left open for me a kindred vein of thought, richer still, though to be worked, I fear, with a skill inferior to his. I refer to the connection between science and religion, — a connection obvious when theoretically considered, and capable of actual verification in the authentic history of science; enjoying indeed, over a similar view of literature, this advantage, that literary worth is a matter of individual taste, and, if people choose to admire Voltaire or worship Gōthe, none can gainsay them, while every new discovery or generalization in science is a fixed fact in the annals of the race, and every non-discoverer in the walks of science is an equally fixed and indisputable negative fact. Think not that I appear on this occasion in a professional capacity, and am going to inflict a sermon on an audience convened for a widely different purpose. Elsewhere it is my province to present religion in queenly robes, and with a voice of absolute command; here I ask you to regard her merely as a handmaid. Yet, should her fidelity as a servant win any heart to do homage to her as a sovereign, I shall have attained my ultimate desire and aim. But my design is to offer you such a view, as might be presented by a professedly scientific man of a sufficiently catholic mind to take religion into the circle of the sciences.

There is a wide difference between knowledge and science. Isolated facts and phenomena are the materials of knowledge; science ascertains their laws, relations and harmonies. Knowledge may be acquired, retained and transmitted by any man of ordinary powers and good memory; science is the creation of the few great minds, one of whom suffices to shed lustre upon an age. Of men popularly deemed scientific, and eminently so, the greater part make no contributions to the progress of science, and are incapable of aggression upon the vast domain yet unconquered. Of this class are many of those, who have great learning, write good books, and repeat difficult experiments, whose sole work is to decant old wine into new bottles, while others have planted the grapes, and trodden the wine-press. To the same class belong many of the discoverers of new facts and the inventors of new processes,—men of great skill and adroitness, but not necessarily of creative power. Science is the classification of facts under principles, — of phenomena under essential laws; and the progress of science consists in successive generalizations, each surpassing all that have preceded it in comprehensiveness and simplicity. The scientific discoverer is he, who traces out laws or harmonies before unknown, or enlarges the scope of those already recognized. I propose, first, to exhibit to you the essential agency in this work of just and adequate religious ideas and sentiments, and then to justify my position by a cursory survey of the history of science.

Scientific truths are not written upon the surface of nature; nor can they be ascertained by mere felicitous conjecture, which might range forever, and range in vain, among the numberless theories possible in every case. A false theory never suggests the true. *Yes* and *No* are the only answers, which the scientific inquirer draws from nature; and whether he ever gets a *Yes*, depends on the shaping of his questions. The welcome answer is for him alone, who knows how to ask. In the fields of science, one reaps as he sows, — takes what he brings. The most patient research cannot initiate into the mysteries of nature him, whose antecedent conceptions of the objects of science are vague, narrow or exaggerated. The successful inquirer must come to the investigation of facts, with adequate antecedent ideas, — with the general outlines of his theory distinctly traced in his own mind. But whence is he to derive those antecedent ideas? How shall he frame his questions? How can he descend to the investigation of parts and details with just conceptions of the whole? Analogy must ask his questions, and shape his theories. And what is the basis of analogy? It is the general plan of the divine administration,—the traits of the infinite mind portrayed in the constitution and course of nature. The attributes of God are the ultimate cause,—his ideas, the archetypes, of all things. Just and lofty views of his character furnish therefore starting-points and data for philosophical research. They indicate the direction in which truth lies. They supply the essential outlines and elements of every department of science. On the other hand, ignorance or non-recognition of the divine attributes prompts fruitless questionings, leads into mazy paths that terminate nowhere, makes up false issues, and passes by truth within grasp, in the vain effort to arrive at those occult forces, which can only be resolved into the varied agency of the Creator.

To commence with the simple idea of an infinite First Cause, where this has been ignored, man has always philosophized, as if he were the centre of the universe; and his theories have all partaken of his own littleness,—his system of nature has been dwarfed, his conceptions narrow and inadequate. So it was in the ancient world. The boundless heavens were but a jewelled canopy for the dwellers upon earth, and the whole realm of matter and of mind was seen as through a diminishing lens. But the conception of an infinite Creator sends the beholder back from the centre to his true place in the remote circumference of the universe; and its bounds at once expand and recede before his enlarged vision. The stars, from spangles on the curtain of night, grow into clusters of rejoicing worlds; and the immeasurable Creator is mirrored forth in majesty and grandeur from every scene of nature and of life.

Similar is the effect on science of the distinct recognition of the divine unity. Ancient philosophy could acquiesce in jarring elements and conflicting systems. It was content with partial generalizations. It sought not uniformity. It presupposed no harmony in nature. But modern science is led on, by faith in the divine unity, from complex to simple laws, from lower to ever higher stages of generalization. It assumes unity of purpose and result as the basis of its theories. Its aim is to trace out in creation the undivided Godhead. Its whole progress is the development of more and more perfect and comprehensive harmonies. It is constantly bringing isolated phenomena into the embrace of law, interlacing by subtle filaments of resemblance or analogy the most unlike classes of objects and tribes of being, tracing to their meeting-point divergent lines once deemed parallel. In astronomy, it has already belted the vast globe, the stars, the universe, with the inscription, GOD IS ONE; and now it is seeking marks of identity in heat, light, gravitation, the electric, the magnetic force, the vital principle, the medium of sensation and of voluntary motion, and will soon draw forth from these hidden powers, pervading all space and being, the echo of that sublime truth, with which it has girdled the heavens.

Faith in the boundless benevolence of the Creator plays a no less important part in the development of science. On this alone rests the doctrine of final causes, as applied to every form of organized existence. From this is inferred the beneficent design and tendency of all the adjustments and provisions of nature. Resting on the axiom of religion, GOD IS LOVE, as the basis of all its theories, modern science has traced the footprints of a paternal Providence in every portion of the outward universe. In the economy of animal and vegetable life, it has left no organ, no arrangement, without its ascertained use and end. From the darker and more terrific phenomena of nature, it has drawn forth voices of praise and gladness. The lightning, no longer a fiery winding-sheet, is hailed as a swift-winged minister of health. The eclipse, once beheld with awe and dread, has become a sublime interlude in the harmony of the spheres. The wandering fires of the comet glow no longer with the lurid glare of wrath, but with rays of infinite love. Nor can the impulse thus given to inquiry cease, until the merciful ministry of the entire economy of nature shall be clearly defined and fully demonstrated, —until the record of the divine paternity shall be transcribed from the New Testament upon every form of life and every portion of the outward universe.

Thus do just conceptions of the Creator furnish adequate analogies for the scientific inquirer. But science is indebted to religion, not only for the analogy, which always shapes the leading question, but for the induction, which gives the final and comprehensive answer. General laws and principles, whether in physical or intellectual science, are to be reached only by induction. Observation, consciousness and experience are necessarily limited in space and time, and can give but partial answers. Induction extends these answers through all space and all time, converts particular facts into all-embracing truths, and puts the universe within the grasp of science. The inductive philosophy, though so obvious that we can hardly conceive of a time when it was not recognized, rightly dates its promulgation with the age of Bacon, but it is to be regarded less as his discovery, than as the point of progress, which the human mind had attained, when he entered upon the stage. Aristotle indeed speaks of induction; but seems to have regarded it merely as a hypothetical and tentative process, and had no idea of it as an instrument of boundless power for the discovery of truth and the increase of human knowledge.

The only form of reasoning recognized for many ages was the syllogism, which adds nothing to the domain of science, but simply classes separate facts under laws previously known. Logic was thus employed in the analysis of such truths as were already the property of the human mind, and not in the enlargement of its orbit, and the expansion of its sphere of thought. The reason of this undoubtedly was the lack of a settled faith in the consistency, order and stability of the universe. The syllogistic mode of reasoning had its birth, when the heavens and earth were cantoned out among numberless conflicting deities, and when fickleness and caprice attached themselves to the highest idea of the divinity, which the mass even of philosophers could reach. And, during much of the time that intervened between the promulgation of Christianity and the Protestant Reformation, the prevalent conceptions of the Creator were but little elevated above those that had prevailed in the classic ages. The sublime theism of the Mosaic and the Christian Scriptures developed itself in the faith of Christendom by gradual and slow approaches; and the angelology and demonology of the middle ages hung as a heavy clog on the excursive powers of the human intellect. It was needful for the mind to be bathed, as it were, in Christian ideas, for many centuries, before it could look upon the system of nature as a symmetrical whole, reflecting from a past to a future eternity the image of one unchangeable Creator. Nor, till this stage had been reached, was it possible for the inductive philosophy to have birth. Induction is based on the immutableness of God, on the harmony of his attributes, on the self-consistency of his administration. It is indeed defined to be syllogism, with the unchangeableness of the Creator for a constant term. I accept the definition. But this constant term transfigures syllogism from a pander to scholastic subtleties into the gatekeeper of the temple of eternal truth. Its aim is now onward and upward. It no longer delves in cloisters among paltry cabalistic terms, raking over the accumulated dust and rubbish of centuries; but it is out in the fields, on the waters, among the stars, — it goes on the wings of the wind, — it rides the lightning's flash, — it floats on the ever-retreating confines of the unexplored and unknown, — it lifts boldly, yet with reverence, the veil that hangs over the throne of the Omnipotent.

Such is the ministry to science of the fundamental doctrines of Christian theism. This ministry they can perform only for him who believes in them; and must needs perform it the most surely and effectually for him, who embraces them, not with a merely intellectual assent, but with adoration and love. I, therefore, next remark that a devotional frame of mind is eminently favorable to the pursuit of scientific truth. The affections, when fixed on worthy and lofty objects, instruct the intellect, and anticipate its more tardy processes. They apprehend truth by a consciousness of its moral adaptations and harmonies. They take intuitive views, which subsequent research and reasoning verify and confirm. A pure moral taste of itself constitutes a higher reason, which seldom misleads. It discerns instinctively those elements of fitness, symmetry and beauty, which are inseparable from scientific truth. Thus a man of elevated moral and religious sentiments learns faster than he can reason. He often knows the result before he has weighed the arguments, so that what to others is proof, is to him mere verification. Take in the same department of science two persons of equal natural endowments and mental culture, one of whom has developed, the other neglected and dwarfed the religious nature;—you will find, in the first, a certain aptness and promptitude in the perception of resemblances and analogies, a tendency to seize at once upon the right point of view, a quickness of apprehension outspeeding the formal steps of analysis and proof, in fine, an affinity for truth, as ready and infallible as that chemical affinity, which draws unlike material substances together,—while, in the other, you will discern, (even with an equal or superior aptness for the reception of positive proof,) a blindness to many of the intrinsic marks of truth, an incapacity of anticipating results, and, in general, a mechanical condition of the thinking powers, indicating their subjection to a lower class of laws than those which govern the intellect, touched to finer issues by the spirit of sincere devotion.

Devotional habits also enlarge and exalt the mind, performing for it the same office which the *extensor* muscles do for the limbs of the body, preserving it in full tension and vigor, with its excursive powers constantly reaching on and up for broader, loftier views, as in more perfect accordance with the glorious and infinite majesty of the Creator.

A devout spirit also places a man in an enviable position for the exercise of his mental powers. The mind, in order to work to advantage, must be stable, calm, self-collected, released from the tyranny of the lower appetites and passions, and bound to its true orbit by a sense of duty and accountableness. If it be harassed by disturbing forces, its results are inadequate to its capacity. Now devotion puts the soul in its true place towards both God and man, checks its uneasy, restless flights, subdues appetite, bridles passion, makes conscience supreme, and enlists mind, heart and strength in the earnest pursuit of whatever is worthy the interest of a God-born immortal. "Give me a place to stand," said Archimedes, "and I will move the world." The devout man has that place, at the blending point of the rays of infinite wisdom and love. In all his great, essential interests, he is immovably fixed. He has his God-appointed centre of activity, where he may take his stand, and put forth to the utmost effect whatever power he has; and, if he be a great man, he can move the world,—he can raise the world,—can make new disclosures of truth, search out higher laws of being, carry onward the knowledge of the race towards the uncaused Cause of all things, and enlarge the orbit of the human mind towards that of Him, whose goings forth are from eternity.

Such are some of the essential offices, which religion discharges for science. To verify this view, I will ask you now to survey with me the history of science. I hope to show you that, in point of fact, only men of religious faith, and for the most part only devout men, have been legislators in the realm of science, while the irreligious and unbelieving, who have obtained eminent reputation as scientific men, have been employed chiefly in verifying, arranging and applying the laws and principles discovered by a widely different order of minds. This distinction may be traced in ancient, no less than in modern, times. The few great men of classic antiquity, who enlarged the bounds of human knowledge, and who, even to our own day, exercise an admitted sway over men's minds, were all, to the full measure of their light, reverent and devout. On the other hand, the last traces of the influence upon mind of the atheistical philosophers of antiquity vanished ages ago. Nay, their very works have perished, and are known to us only by extracts and references in works of an opposite character. Of Plato, the almost Christian theist, we have voluminous writings extant; of Democritus, the father of the atheistical school of Greek philosophy, who wrote as much as Plato, not a word remains.

Pythagoras and Plato present a striking analogy between their theological and their scientific attainments. Unlike in many of their speculations, they were both men of lofty spiritual yearnings. They heard the still, small voice of the Almighty in the harmony of the spheres. They felt the pulsations ot the Supreme Intelligence in the depths of their own consciousness. They could not rest in the low, gross conceptions that prevailed around them; but were spiritualists from the necessity of noble minds. Yet they could not "by searching find out God." From their low starting point and limited means of culture, they could not reach the idea of a simple personal Deity; but acquiesced in a mystical, dreamy pantheism, their conceptions vague as they were vast. And before their minds there also floated visions of scientific truth no less vast, yet no less vague. Their ideas of the system of nature were lofty, but intangible. They beheld shadowy outlines in the misty sky; tbu could neither define them, nor fill them up. They left behind them the germs of many great truths; but there were none to bring them to maturity. They, therefore, remained in embryo, like seed-corn in a mummy-case, till, beneath Christian culture, they put forth leaves, blossoms, and rich, ripe fruit.

The annals of ancient science bear the name of but one truly great discoverer,—Archimedes; and all the records that we have of his life and labors, lead us to regard him as a man deeply penetrated with a sense of the infinite God, and convinced, in theory, of the all-embracing grasp of law and system in creation, antecedently to those discoveries which have made his name immortal. There were others, among the ancients, who rendered eminent service to science in the arrangement and classification of its materials; but their methods were artificial, and adapted merely to the preservation of facts for subsequent use. This was the sole merit of Aristotle, and, in later times, of Pliny, in natural history and science. This was all that Hipparchus and Ptolemy did for astronomy. The phenomena of the heavens had been observed from the earliest times; and an immense, chaotic mass of facts had been accumulated. These they reduced to some semblance of order, by hypotheses purely phenomenal as to their basis, and involved and complex to the last degree, which could not have had a momentary hold on human belief, had the idea of symmetry and perfectness in the system of nature once gained currency. They established, where there was wild anarchy before, a provisional government, to last till there should arise a lawgiver, who could write out the ordinances of the heavens, and measure the paths and bounds of sun and star.

The waste of ancient science is an eminently instructive chapter of the history of mind. A vast amount of fruitless labor was expended in mere cosmogony, which Christian theism has stricken from the list of sciences. The ancients thought themselves bound to account, by natural laws, for the primeval origin of all things. Modern science, while it marks the phases and revolutions of our globe and system for countless ages before man had birth, rests, for its ultimate ground, on the simple declaration of Moses, "In the beginning God created the heavens and the earth." It beholds in the divine fiat an adequate force and cause for the state of things where its last research terminates, and lets the veil still rest on the pristine act of creative power. The author of that marvellous piece of smooth sophistry, "Vestiges of Creation," has, indeed, sought to lift the veil; but has only succeeded in showing that the philosophy of atheism has not taken an onward step since the days of Lucretius, and in writing, in the clearest characters, upon his own labors the inscription with which he sought to label the works of the Omnipotent, "*E nihilo nihil fit.*"

There was also a vast waste of intellect in the attempt to disinter the hidden forces of nature. The idea of power was developed much earlier than that of law. A sense of immeasurable power in creation oppressed the mind, ages before it awoke to the perception of order and harmony. Each of the great agencies in the material world was thought to be pervaded by a separate inherent force, in itself a sufficient cause for its own entire class of phenomena; and the attempted analysis of these imagined forces usurped the time, energy and philosophical acumen, which, rightly directed, might have laid the foundation of the inductive sciences. Christian theism recognizes but one force, and that one, the indwelling and ever-working spirit of the Omnipotent in all space and time, the same in the nascent germ and the gravitating planet, in the wavelet of light from the remotest star and the throbbings of the human heart. This boundless force revealed and owned, science now has only to trace its varied modes of action, and to read the unchanging laws inscribed on creation by its Author and Father.

Ancient science also wasted much of its strength in mere verbal analysis. A large amount of the reasoning of the ancients on scientific subjects was based on the established *usus loquendi*, and consisted in the mere application of terms, assuming their perfectness and adequacy, and the infallible truth of the ideas attached to them. They inferred the most comprehensive principles from the names currently given to objects, or from the trivial phrases employed in common discourse. Thus Thales, when asked, "What is the *greatest* thing?" replied, "*Space*, for all other things are *in* the world, but the world is *in* it," — a puerile conceit based on the ordinary colloquial use of the preposition. Aristotle's usual starting point, on a course of reasoning, is, "*We say* thus and so in common language." I might, had I time, quote numerous examples of this kind from him, and not a few from other ancient writers. This mode of reasoning resulted from the place, which man then conceived himself to occupy in the creation. His own ideas were his only ultimate measure and standard of truth. His highest notions of the divinity were subordinated to his philosophy, and circumscribed within the metes and bounds of an inflexible terminology. There was no distinct recognition of a supreme, independent, self-conscious Intelligence, from whose immutable ideas, gradually unfolded to the reverent and truth-loving, finite minds might modify, correct and enlarge their own conceptions. The mind of man was thus kept revolving from age to age in the same narrow circle, and filling the whole area of that circle with childish sophisms. We can minister to the growth of science, only by holding its terms as auxiliary and provisional, by modifying them to meet its enlarged necessities, and by deeming no idea ultimate or absolute but that of God.

But time forbids me to dwell longer on remote antiquity; nor will Arabian science claim more than a passing notice. The Mahometan theology, though in form recognizing the divine unity, was coarse, grovelling, anthropomorphic. It presented no large or lofty views of the divinity. It gave the mind no point of support in its search after truth. Arabian science was consequently insignificant in its results and achievements. It produced immense and countless volumes; but they were collections of isolated facts, copies from the ancients, and prolix, jejune commentaries. The Arabs displayed great avidity for knowledge, but no power of generalization; nor have they left a single name to be enrolled among the creative and legislative minds in the history of science.

We pass to modern Christendom. Here great discoverers are not numerous. The sciences, that may now be regarded as the most nearly perfect, have been shaped from chaotic materials by the bold and rapid generalizations of a few master minds. In the kindred sciences of Mechanics and Hydrostatics, we have for the chief names Galileo, Pascal and Boyle, by whose side we can place no *fourth* as their equal. Galileo constantly recognizes the divine presence in nature, frequently takes the fundamental truths of religion for the premises of his arguments, and writes as one that is searching out the thoughts of God. Pascal, second to none in keen scientific insight, threw his fame as a philosopher into the background by the lustre of his religious character, — by his apostolic fervor, saintly purity and martyrlike self-denial. Boyle, in his investigation of natural laws, professed himself constantly under the guidance of religious ideas, and as a philosopher viewed everything in its bearing upon the divine attributes and administration. He too led an eminently religious life, expended large portions of his income for the translation and diffusion of the Scriptures, labored with consistent and persevering zeal in all the then open departments of Christian philanthropy, and, in dying, by a generous bequest, made our own University the trustee of his pious purposes of the conversion and instruction of the North American Indians.

Astronomy, as a definite and symmetrical science, owes its birth to the successive generalizations of Copernicus, Kepler and Newton; and for them faith held the torch to science, — showed them the remotest stars in the embrace of the same guiding Providence, without which the sparrow falls not to the ground, — prepared them to embrace laws simple as the divine unity, vast as Omnipotence. Copernicus defends his system of the universe by considerations drawn from the symmetry and harmony to be looked for in the works of God. Kepler, in expounding the motions of the planets, calls upon his readers to praise and celebrate with him the wisdom and greatness of the Almighty, and constantly adduces the divine attributes as reasons for the laws that bear his name. Newton was a man of humble faith and of simple, childlike piety. He speaks of science as chiefly to be valued, because it brings us nearer to the knowledge of the supreme First Cause. He finds traces of the Creator in every provision, law and harmony of nature; and closes his Principia by a sublime tribute of praise to God. His law of universal gravitation, in its unity, simplicity and comprehensiveness, seems the last generalization possible within the proper limits of astronomy, though gravitation itself will no doubt yet be proved identical with other material forces, and all the physical sciences brought into closer harmony than we can now imagine. But, since Newton left the stage, it has been work and glory enough for subsequent astronomers to verify and apply his theories, — to develop in detail the celestial mechanism, which he first saw at a glance. This, infidel philosophers, great in figures, like D'Alembert and Laplace, have successfully done. And such as they can do the journey-work of science, — can perfect the purely mechanical part of arrangement and calculation; but it is not for them to approach the oracles of truth, and hear those responses, which, uttered in the ear of the devout philosopher, command light out of the darkness of age-long ignorance, and order from the chaos of ill-jointed theories and obsolete systems.

The existence of chemistry, except in groping experiments and vague surmises, bears date less than a century ago; and many of its fundamental laws are yet undiscovered, or stand in the form of postulates, and need additional demonstration. But the discoverers of its established principles fall easily into the ranks of the fathers of mechanical and astronomical science. To specify a few of these, Black, to whom we are indebted for the laws of latent heat, and for much of the earliest light thrown upon the chemistry of the gases, delighted to trace and exhibit the beneficence of the Creator in those portions of the economy of nature, which he brought to view. Of Lavoisier, who first analyzed the atmosphere, discovered the properties of oxygen, and fully identified the laws of acidification and combustion, it is enough to say that he was ostracized in Paris, when everything but virtue was tolerated, and fell beneath the guillotine, when to be a good man was the only capital offence. We owe the theory of chemical atoms, and the numerical laws of combination, which promise chemistry a place among the exact sciences, to Dalton, — a simple-hearted, lowly, devout member of the Society of Friends.

Second to none in the earliest ranks of scientific botany was Ray of Oxford, — the first systematic writer on natural theology, whose numerous works in that department, full of profound learning, and redolent throughout with the breathings of an eminently devout spirit, furnished Paley with many of his richest materials and choicest illustrations. Linnæus was full of religious sentiment, and in his lectures and on his excursions constantly expatiated with fervent eloquence on the divine wisdom and beneficence. He heard the voice of the Lord God among the trees of the garden, — tracked his footprints in the hoary forests, — plucked with devout admiration and love the humblest wayside flower. In harmony with his blameless and beautiful life, was the inscription on the door of his lecture room, "*Innocui vivite; numen adest.*" While there are some eminent botanists, of whose religious convictions and characters I can trace no record, I cannot find the name of a single known unbeliever, who has left a distinct mark in the history of botany. But, in my apprehension, while descriptive and analytical botanists have been accumulating materials for the growth of their science, and while rapid progress has been made within the last few years in vegetable physiology and chemistry, botany, as a classificatory science, has received few permanent laws, — has been enriched by few well-grounded generalizations, since the days of Linnæus. Though I know nothing in the character of either of the Jussieus, which would predispose me, for the sake of my argument, to undervalue their labors, permit me to say, (I am aware that the opinion will have a strangely obsolete sound in the ears of professed botanists,) that their Natural Orders have not in a scientific aspect superseded the Linnæan system. I acknowledge the superior claims of the Natural Orders in a practical and officinal point of view. They are based on obvious and important characteristics. They group together plants of kindred habits, properties and uses. But the Linnæan system, founded on the number and position of the vital organs of the plant, keeps continually before the mind that beautiful network of correspondences and equivalents, — those filaments of a uniform plan in boundless diversity, which bring the summer world around us into the closest harmony with the vast whole of nature, and draw the same voices of praise from the flowers and the stars. But in science I am of the unanointed laity; and would enter my dissent from the priesthood with unfeigned diffidence.

We pass now to animal physiology. Here Galen seems first to have propounded theories, that will bear the light of modern times. He distinctly maintained the doctrine of final causes, and professed to be guided by it in his researches. His discoveries seem, from his own showing, to have resulted from his antecedent faith in the wisdom and benevolence of the Creator, — a faith, which sustained him in the persevering and reiterated effort to arrive at uses and ends, which long eluded his inquiry; and he speaks with indignation of those (so called) philosophers, who imagine that symmetry fails and utility ceases, where their own powers of observation are at fault. He pursued all his investigations in the spirit of reverence and worship, and styled his great work "a religious hymn in honor of the Creator." The position of the valves in the veins must have been observed, many centuries before Harvey inferred from it the circulation of the blood; but the living tide, which had ebbed and flowed in millions of hearts for nearly six thousand years, awaited for its discovery the clear insight of a devout believer in the kindly use and adequate end of every portion of the animal economy. Cuvier has performed for the kingdoms of animated nature the work which Newton wrought for the mechanism of the heavens. His generalizations now seem final and complete. They bind together all tribes of being in one vast and beautiful system, pervaded by analogies and equivalent provisions; and reveal, in the structure and adaptations of the animal economy, numberless mysteries of divine wisdom, which had been hidden from the foundation of the world. He reached these sublime results, because his religious nature prompted him to look for unity and harmony in the works of God, — to search everywhere for traces of the all-pervading and all-perfect Mind, — to seek in the humblest zoophyte the expression of an idea of God, — the not unworthy type of the Infinite Archetype. He wrought in glowing faith. He served at the altar of science as a priest of the Most High. Infidelity went from his presence rebuked and humbled. His soul was kindled, his lips were touched ever more and more with the fire of heaven, as, with waning strength and under the burden of bereavement, he still drew bolder, fuller harmonies, unheard before, from the lyre of universal nature. Says one who was present at the lecture, from which he went home to die, "In the whole of this lecture there was an omnipresence of the Omnipotent and Supreme Cause. The examination of the visible world seemed to touch upon the invisible. The search into creation invoked the presence of the Creator. It seemed as if the veil were to be torn from before us, and science was about to reveal eternal wisdom."

My limits have obliged me to cite but few of the great men of science. I might add many more, in the same and other departments. But I have named those, who, by the confession of all, hold the foremost rank; nor do I fear that the list of unbelieving philosophers can furnish a single name to be placed by the side of the least of these.

The doctrine of my discourse, did it need additional proof, might find it in the records of infidelity, and especially in that carnival season of unbelief, — the age of the French Revolution. There never was a period of so much intellectual brilliancy, as the reign of terror in France. The kingdom, the metropolis, swarmed with men of the highest and most varied culture. Voltaire, who had run the entire circle of all things that could be known, had indeed passed off the stage; but his versatile genius, his amazing industry, his defiant skepticism, gave tone to the age, of which, in default of all but demon-worship, he was the patron saint. I once saw a large collection of autograph mandates for the guillotine. Among the signatures, I recognized, as arch-murderers, many of the most accomplished men and writers of that or any age, chemists, mathematicians, philosophers, men who looked down upon the great of other times, as we look up to them. Half a century has elapsed, and their lights have almost all gone out. Here and there one flickers, and is suffered to burn to its last drop of oil by that Christian forbearance, which quenches not the smoking flax. There is no strongly marked epoch in the world's history, which, as to intellectual influence, is now so little felt as this. There remains not one of the unbelieving generation, who is owned as a leading and controlling mind. On the grave of their idolized Voltaire it is hardly in good taste to cast another stone; for the arch-scorner, (though possessed of brilliant and fascinating powers, which will preserve his lighter and less faulty works from speedy oblivion,) as regards all recognized authority and influence, now lies too low for scorn. Where confidence is demanded, none believe or trust him. His most voluminous works, and those by which he hoped to overthrow the faith and revolutionize the opinions of Christendom, are mouldering, unhonored and unread. The very nation that worshipped him now regard him as a mere word-juggler, made up of falsities and fallacies. And the only epitaph that posterity will inscribe on the sepulchres of the great men of his school, is that mystic word, traced by the unseen hand on Belshazzar's wall, "TEKEL: — thou art weighed in the balance and found wanting." But what lacked they? They had all that a merely material culture could give them. But they lacked that expansion of intellect, that breadth of vision, which faith in God and heaven alone can give.

I have in this discourse omitted all reference to mental philosophy, not because I doubt that it depends for its successful cultivation on right and adequate religious ideas, but because its whole field is still *sub lite*, and I cannot therefore cite any great fundamental principles as resting on the same basis of established certainty with the law of gravitation, or the doctrine of final causes in physiology.

The case however is different with the moral sciences, and under this name I include all those, which relate to the laws of individual and social duty and well-being. In these sciences, there have been established many principles, from which the world will not recede; and they have been established through the agency of religion. In this class of results, not only the great truths of natural religion, but also the leading principles of Christian ethics have borne an essential part. There is not an admitted point in moral science, not an undisputed maxim in political economy, which rests not on those spiritual laws first revealed in the New Testament, though coeval with the human race. Thus the old doctrine concerning "the balance of trade," with the numerous selfish arrangements of international policy based upon it, has been eradicated by the recognition of that law of universal brotherhood, which, whether among individuals or nations, makes the good of one the good of all. The vast system of insurance, a science of itself, resting as it does in all its details on wide and bold generalizations, could have grown into being only under Christian culture. The idea of thus disarming the shafts of deadly calamity, as the electric conductor draws the thunderbolt harmless to the ground, could have originated only under the auspices of a religion, which bade men bear one another's burdens; and the whole system embodies in its general features, and is fast approaching in its modes of organization, the New Testament maxims of reciprocal helpfulness and charity. The modern doctrines concerning crime and punishment, and the more humane ideas of criminal jurisprudence, which are now in the course of successful demonstration, owe their origin and development solely to religious, Christian ideas of the nature, dignity, sacredness and infinite worth of every human being, considered as an undying child of God, as in his wanderings and his sins the subject of the love of heaven, as never, while life lasts, beyond the power of divine truth or the pale of divine forgiveness. The extension of kindred ideas to the true dignity and glory of nations is now leading great minds throughout Christendom to question the lawfulness and necessity of war, with its wasteful apparatus; nor will another generation have passed away, before the maxims, "Love your enemies," "Avenge not," "Overcome evil with good," will be deemed as essential laws of national policy, as they are now of individual Christian duty.

But it was not my intention to enter upon the discussion of this class of topics, which would demand a separate discourse, and to which I could not now do the least justice without atrocious injustice to an already long-suffering audience.

I have attempted to illustrate the connection of religion and science. The connection is not incidental or arbitrary, but inherent and essential. The materials of both are the same,—the thoughts of God. Religion reads them in their source; science in their developments. Brethren, scholars, men of science, yours is a priestly calling. You pursue it within temple gates and on holy ground. See that it be with pure and reverent spirits. Thus may you be leaders in the ever-onward movement of humanity towards the clear vision of truth in nature, and the sincere worship of Him, of whose ideas the universe is the transcript, its history the utterance.

610 9

BL241 .P4
An oration delivered before the Phi
ADR6025
Gutman Library
3 2044 028 312 692